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A Brief History of Stereographs and Stereoscopes

Stereographs (also know as stereograms, stereoviews and stereocards) present three-dimensional (3D) views of their subjects, enabling armchair tourists to have a “you are there” experience. The term “stereo” is derived from the Greek word for “solid,” so a “stereograph” is a picture that depicts its subject so that it appears solid. Stereographs feature two photographs or printed images positioned side by side about two and half inches apart, one for the left eye and one for the right. When a viewer uses a stereoscope, a device for viewing stereographs, these two flat images are combined into a single image that gives the illusion of depth.

Stereoscopes work the way that vision works. Since our two eyes are positioned about two inches apart, we see everything from two slightly different angles, which our brain then processes into a single picture that has spatial depth and dimension. In 1838, Charles Wheatstone published a paper that provided the scientific basis for stereography, showing that the brain unifies the slightly different two-dimensional images from each eye into a single object of three dimensions. Wheatstone’s early stereographs were drawings rather than photographs.

The Great pyramid of Gizeh

"The Great pyramid of Gizeh, a tomb of 5,000 years ago, from S.E.

Egypt." Stereograph. NY: Underwood and Underwood, 1908. From TIMEA. (August 19, 2006). http://hdl.handle.net/1911/5586 Note how only half of the tree on the left side of the left frame is visible, while two-thirds of the same tree can be seen in the right frame.

Between the 1840s, when stereographs were first made, and the 1930s, when they were supplanted by movies and other media, millions of stereographs were produced. In the late 1830s and 1840s, scientists such as Niépce, Daguerre and Talbot created the processes that made photography possible and these were soon used to produce stereographs. In 1850 Sir William Brewster invented an inexpensive viewing device for stereographs called the lenticular stereoscope. This device is a closed box that has one or two openings for light; two lenses are located on the top and enable the viewer to see a three-D image on the floor of the box.

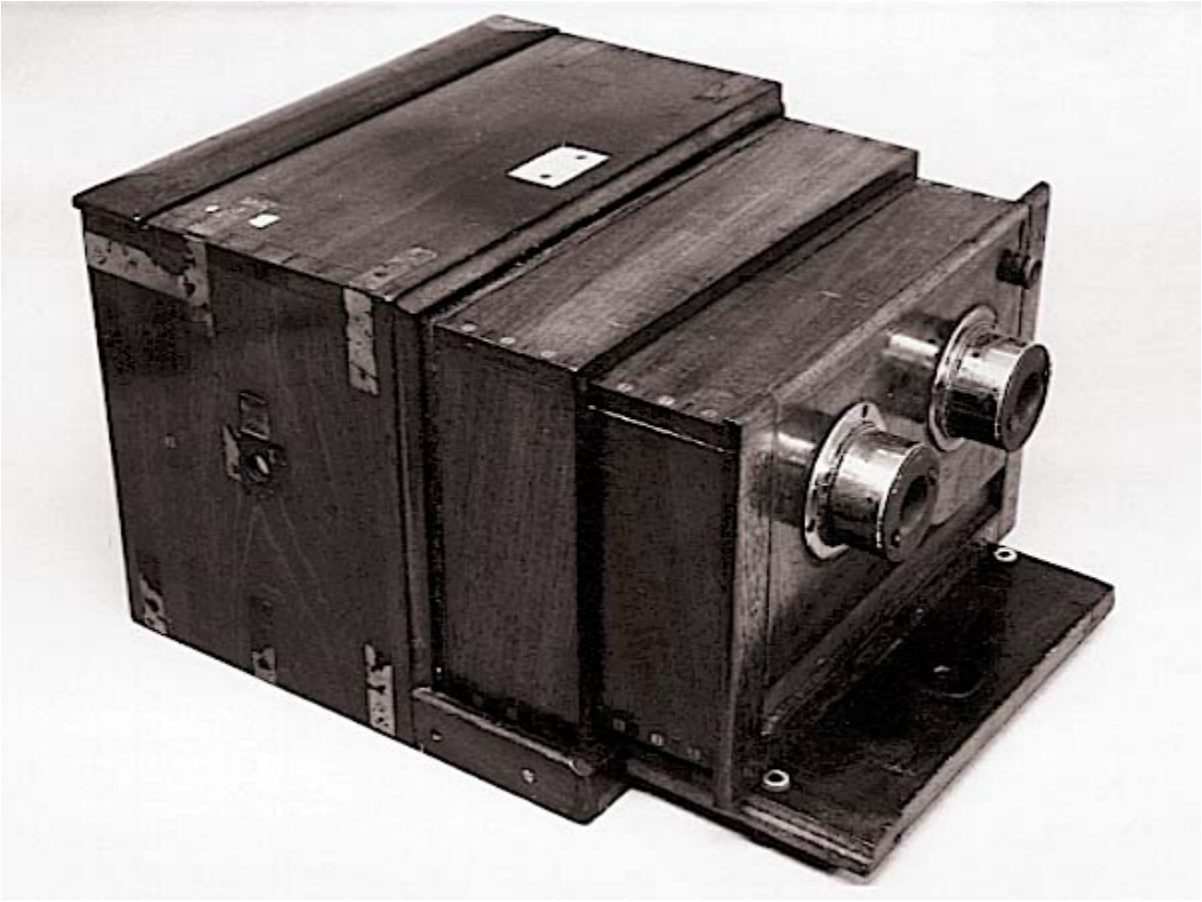
In 1851, stereographs captured the public notice when they were displayed at the Great Exhibition and praised by Queen Victoria. Businesses such as the London Stereoscopic Company quickly developed technologies for mass-producing stereographs; indeed, between 1854 and 1856 the company sold over half a million stereographs. In America, doctor and writer Oliver Wendell Holmes helped to popularize stereographs by inventing a hand viewer and promoting the creation of stereograph libraries. Ultimately stereoscopes ranged from small, inexpensive hand-held devices to large pieces of furniture that could display a changing series of up to 100 stereographs.

“A reproduction Holmes stereoscope.” “Stereoscope.” Wikipedia. 11 August 2006 http://en.wikipedia.org/wiki/Stereoscope

Stereographs came in a variety of formats that reflected the era and region in which they were produced. At first stereotypes were produced as daguerrotypes (printed on copper) and ambrotypes (printed on glass), but stereographs became much more common once they began to be printed on card stock, which was less expensive and more stable. Paper stereographs

mounted on flat cards were generally produced between 1857 and 1890, while those mounted on a “warped” gray card were generally produced between 1892 and 1940 (Darrah, 10-11). Early stereographs measured approximately 3 1/2 x 7 inches, but during the 1870s larger sizes emerged, including the 4 x 7 inch “cabinet,” the 4 ½ x 7 inch “deluxe,” and the 5 x 7 inch “imperial” cards. By the late 1850s, the standard thickness of cards was .04 inches. Curved mounts became prominent in the 1880s, after B. W. Killburn found that a mount with a slight curvature could increase the illusion of depth.

Initially photographers created stereographs by taking one photograph, then slightly shifting the camera to a new position. Cameras with multiple lenses were eventually used, although some photographers employed a rig with two cameras. (For more on stereograph cameras, see http://stereographer.com/cameras.html). Photographing for stereoscopes required the photographer to position the camera carefully to get the best vantage point.



"Sliding Box Binocular Stereoscopic Camera, ca. 1865 ." From the Museum of the History of Science, Oxford's exhibition "The Technology of Photographic Imaging" http://www.mhs.ox.ac.uk/cameras/index.htm. This camera, manufactured by W. W. Rouch of London, uses two single landscape lenses of 100 mm focal lengths.

Between the 1840s and the 1920s, stereographs served as an important method of entertainment, education, and virtual travel—predecessors to contemporary forms of media such as television and movies. As Burke Long argues, "Mass-produced and relatively cheap, the integrated system of mechanical viewer and photographs became fashionable for classroom pedagogy, tourist mementos, and parlor travel to exotic places of the world" (90). People viewed stereographs at homes, schools, and churches, gazing at images documenting almost every subject imaginable from astronomy to zoology. According to stereograph collector and historian William Darrah, stereographs were used to teach millions of American children about geography, natural history, and a range of other subejcts (50). Many in the nineteenth century embraced photography as a medium that, unlike other arts such as painting, presented the "truth" through exact rendering of a scene. Stereographs seemed even more real and more engaging by simulating three dimensions. Oliver Wendell Holmes called stereographs "sun sculptures" and commented, "All pictures in which perspective and light and shade are properly managed, have more or less the effect of solidity; but by this instrument that effect is so heightened as to produce an appearance of reality which cheats the senses with its seeming truth" (16).

By the 1920s, movies and printed half-tone images supplanted stereographs as the leading photographic medium. However, 3-D imaging experienced a resurgence in the 1950s, when the ViewMaster, a stereoscopic device which used a round disc that displayed seven images, was popularized. Initially the ViewMaster was sold as a tourist souvenir, but eventually it became more of a children's toy—indeed, it was named one of the top 50 toys of the twentieth century. A few contemporary artists use stereography as an

expressive medium, while people now don stereoscopic glasses (and data gloves) to explore computer-generated 3D virtual reality environments.

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On the Possibilities for a Deep History of Humankind

In the mid-nineteenth century, as the great French historian Victor Duruy sat down to revise the general history of the world text used in French schools, he found himself facing a question few historians since antiquity had had to contemplate: when should history begin? “Scarcely twenty or thirty years ago,” he wrote, “unexpected discoveries have forced us to break all the old systems of chronology.”[footnote] He was alluding to the time revolution that began in 1859, when the short Biblical chronology, over the space of a decade or so, was abandoned as a geological truth.[footnote] To the new geology was joined the new archaeology, an approach to the past that challenged the very framework of history’s chronology. “A science born yesterday,” Duruy wrote, “has pushed the birth of humanity back to an age where the measure of time is no longer given by means of a few generations of men, as it is today, but instead by hundreds of centuries.”[footnote] His predecessors had all written in the comfortable certainty that human history was as old as the earth, and that both began in a moment of creation in 4004 B.C. Not twenty years earlier, Duruy himself had published a new edition of a sacred history according to the Bible.[footnote] When he took up the task of revising world history for the French curriculum, he was one of the first historians to stand on the precipice of time, contemplating, in his own words, “an obscure and terrifying antiquity.”[footnote]

Victor Duruy, *Abrégé d’histoire universelle, comprenant la révision des grandes époques de l’histoire depuis les origines jusqu’à 1848*, nouvelle édition (Paris: Hachette, 1873), 3: “Il y a vingt ou trente années seulement que des découvertes inattendues ont forcé de briser tous les vieux systèmes de chronologie.”

Important studies of the time revolution include Stephen Toulmin and June Goodfield, *The Discovery of Time* (New York: Harper Row, 1965); Claude Albritton, *The Abyss of Time: Changing Conceptions of the Earth's Antiquity after the Sixteenth Century* (San Francisco: Freeman, Cooper, 1980); Paolo Rossi, *The Dark Abyss of Time: The History of the Earth and the History of Nations from Hooke to Vico*, trans. Lydia G. Cochrane (Chicago: University of Chicago Press, 1984), Stephen Jay Gould, *Time's Arrow, Time's Cycle: Myth and Metaphor in the Discovery of Geological Time* (Cambridge, Mass.: Harvard University Press, 1987); and Thomas R.

Trautmann, *Lewis Henry Morgan and the Invention of Kinship* (Berkeley: University of California Press, 1987), esp. 32-35 and 205-30.
Duruy, *Abrégé*, 4: “Cette science née d’hier a donc reculé la naissance de l’humanité vers une époque où la mesure du temps n’est plus, comme de nos jours, donnée par quelques générations d’hommes, mais où il faut compter par des centaines de siècles.”
Victor Duruy, *Histoire sainte d’après la Bible*, 2nd ed. (Paris: Hachette, 1856).
Duruy, *Abrégé*, 4: “une vague et effrayante antiquité.” The question of how French historians responded to the challenge of deep time has been little studied, to my knowledge. For the situation in the United States and England, see Daniel A. Segal, “Western Civ and the Staging of History in American Higher Education,” *American Historical Review* 105 (2000): 770-805, and Doris Goldstein, “Confronting Time: The Oxford School of History and the Non-Darwinian Revolution,” *Storia della Storiografia* 45 (2004): 3-27.

When Duruy’s concise universal history was published in 1873, the field of history stood at a crossroads. What the Comte de Buffon had once called “the dark abyss of time” (*le sombre abîme du temps*), clearly, was not an abyss. It was more like a rift valley, with new land unmistakably visible on the other side. As an awareness of deep human time filtered into the practice of history during the waning decades of the nineteenth century, general historians like Duruy found ways to acknowledge the new findings. But they had no idea what to do with them, because deep human time did not fit the pre-existing frame used in the field of history.

By the 1930s, historians had come to a jury-rigged solution, resolving the problem of narrative by using the idea of the “Neolithic Revolution” to claim that human history itself came into being with the invention of agriculture and civilization.[footnote] For the preceding half-century, however, historians floundered. In Duruy’s case, the few token paragraphs he devoted to humanity’s deep time were grafted clumsily onto the front end of the history.[footnote]
V. Gordon Childe, *Man Makes Himself* (London: Watts, 1936).
I have explored some of these issues at greater length in *On Deep History and the Brain* (Berkeley: University of California Press, 2008).

Today, the gulf between history and prehistory is no longer terrifying, but it remains nearly as deep as it was in 1873. The inability to close the breach in time was one of the signal failures of history-writing in the twentieth century. In the decades after 1960, the field of history gradually set about the task of recuperating histories that had been invisible to previous historians writing in the Judeo-Christian tradition: histories of women, peasants and workers, marginals, minorities, subalterns, and all those whom Eric Wolf once called the "people without history."[footnote] These moves have enriched the field. But because the peoples of the Paleolithic "belonged" to another discipline—archaeology—they remained invisible to the historian's eye. Because their culture is extinct, moreover, the peoples of the Paleolithic aren't a visibly suffering minority and have no need for justice. This political state of non-being renders them uninteresting to historians moved by advocacy.
Eric R. Wolf, *Europe and the People Without History* (Berkeley: University of California Press, 1982).

If the discipline we call History is a political discipline designed to explain the modern condition, then there is little need for a deep history. But if History is an anthropological discipline designed to explain the human condition, as I believe, there is an urgent need to recuperate the history of Paleolithic peoples, to bring them into the purview of historical studies in the same way that we have brought in Incans, Africans, peasants, and all the peoples who have been denied historicity. This is the task of deep history.

A deep history is any history framed in the full spectrum of the human past, from the present day back to early hominins, australopiths, and beyond. A deep history is not just the study of the Paleolithic era, or everything before the turn to agriculture. Archaeologists and paleoanthropologists already do that. It is instead a philosophical perspective, an invitation to contemplate the entire span of human history within a single frame and treat it as part of the same narrative. For this reason, particular histories focusing on narrower spans of more recent time can contribute to deep history as long as they frame questions in the right way. Deep histories are genealogies. As genealogies, they span the narrow evidentiary bases and the methodological rules that have cut human history into isolated segments.

In the reflections below, I shall begin with a brief historical analysis of why the short chronology typical of the study of history was maintained, with rare exceptions, across the twentieth century. I offer this study on the grounds that the task of designing a deep history will be clearer if we understand why it has taken so long for historians to accept the full implications of the time revolution of the 1860s. Here, I shall focus on trends in the discipline of history, though it is important to acknowledge that for much of the twentieth century, archaeologists were just as interested as historians in clinging to a methodological division of time. According to this division of labor, historians were confined to the short time of written evidence. Archaeologists, in turn, limited themselves to the periods associated with unwritten evidence and had little interest in studying societies that left written records. With this survey in hand, we can more easily appreciate how to move forward in developing a new architecture for the writing and practice of deep history. The key task is to outline a mode of history-writing that escapes the style, much in vogue for thirty years and more, whereby historians plot their histories according to ideas of birth, origins, and revolutions. The use of such metaphors renders deep time invisible. What we need to develop anew is a genealogical instinct.

In his 1962 work, *The Idea of Prehistory*, the archaeologist Glyn Daniel posed this rather plaintive question: “Why do historians in a general way pay so little attention to this fourth division of the study of the human past; while recognizing ancient history [why] do they not give more recognition to prehistory?… Historians are taking a long time to integrate prehistory into their general view of man.”[footnote]
Glyn E. Daniel, *The Idea of Prehistory* (London: Watts, 1962), 134.

To answer this question, we need to go back more than a century and consider the trends afoot as the modern practices of history and archaeology took shape. When History formed as a discipline in the late nineteenth century around the three divisions of History’s short chronology—ancient, medieval, and modern—it adopted as its signature method the analysis of written sources. In a manual of historical studies published in 1897, probably the most influential of its kind, the historians Charles Langlois and Charles Seignobos argued, “the historian works with documents. Documents are the traces which have been left by the thoughts and actions

of men of former times… For want of documents the history of immense periods in the past of humanity is destined to remain for ever unknown. For there is no substitute for documents: no documents, no history."[footnote]
Or in the words of V.A. Renouf, "historians get their knowledge from written documents. No history of any country can be written unless its people have left some such record of their activities."[footnote]
Charles V. Langlois and Charles Seignobos, *Introduction aux études historiques* (Paris: Hachette, 1897). I used the English translation, *Introduction to the Study of History*, trans. G.G. Berry (New York: Holt, 1898), 17.
V.A. Renouf, *Outlines of General History*, 2nd ed., ed. William Starr Myers (New York, 1909), 2.

This seems logical enough. Yet it is important to realize that this claim represents a significant departure from previous understandings of historical evidence. Universal history, as practiced in the Judeo-Christian tradition, was never defined by methodology. It was defined as a subject: the genealogy of humankind. By way of example, consider the *History of the Franks*, written by Gregory of Tours around 590 CE.[footnote] Though the work was a particular history devoted to the lineage of the Frankish kings of Gaul, Gregory began his account with Genesis and continued through the Flood, the generations of Noah, and the story of Moses and the Children of Israel wandering in the deserts of Sinai. His account of the Hebrew race gradually leads up to the Romans and then, by stages, back down to the race of the Franks. Particular histories like Gregory's ended up focusing on the twigs and branches of the family tree, but the genealogical instinct was common in works of history in medieval and early modern Europe.
Gregory of Tours, *The History of the Franks*, trans. Lewis Thorpe (Harmondsworth: Penguin, 1974).

Since history was a subject and not a methodology, rules of evidence mattered little. As late as 1885, as all academia was beginning to fragment into disciplines, the American historian George Park Fisher recommended that young historians learn how to use written documents such as registers, chronicles, inscriptions, and literature, but he also advised them to consult oral tradition; material structures such as altars, tombs, and private dwellings; and language, using the techniques of comparative philology.

History, in Fisher's view, was written from a broad spectrum of evidence. To this, Fisher added a recommendation to use indirect evidence, to tease historical conclusions out of an array of recalcitrant sources.[footnote]
George Park Fisher, *Outlines of Universal History, Designed as a Text-Book and for Private Reading* (New York, 1885), 3.

So in 1897, why did Langlois and Seignobos narrow down the sources of history so radically to documents alone? History, in trying to recast itself as a methodologically rigorous science, was undoubtedly keeping up with the fashions of the day. But the narrowing of evidence had a second consequence, for it helped to exclude prehistory from the ambit of history. As Langlois and Seignobos put it, "for want of documents the history of immense periods in the past of humanity is destined to remain for ever unknown."[footnote] Writing in 1897, they knew that this was untrue. Their famous contemporary, the French archaeologist Gabriel de Mortillet, had already used the substantial evidence at hand to classify the phases of the Stone Age by tool type. Perhaps, then, their insistence on documentary evidence was an epistemological sleight-of-hand, a ruse, motivated by their pre-existing desire to preserve the realm of history from the vague and terrifying antiquity of which Victor Duruy had spoken. Whatever the motivation, we can see how humanity's deep history broke apart at practically the same moment that it became thinkable.
Langlois and Seignobos, *Introduction*, 17.

So here we have an initial answer to the question posed by Glyn Daniel. In the centuries leading up to the time revolution of 1859, human history was whole and genealogical. In the decades following the time revolution, the subject of history was fragmented along disciplinary lines. Nowadays, history is housed in at least two departments, History and Anthropology. Disciplines, much like cubist paintings, take a unified subject and fracture it on methodological lines. Where the subject of human history is concerned, the methodological division doubles as a chronological division. Archaeologists and anthropologists take responsibility for the Great Before. Historians limit themselves to the Everything After. Despite the enthusiasm for interdisciplinarity these past few decades, there has been very little thought devoted to bringing interdisciplinarity to the study of human history.

Accompanying the disciplinary turn was the well-known shift in subject from the genealogy of kings and battles to the rise of nations. The genealogical mode of writing history used by Gregory of Tours and others is a style of thinking that naturally creates an interest in “first things.” The new mode of history writing that emerged in the later nineteenth century, in sharp contrast, was historically myopic. Metaphorically, it took the form of what biologists would call an ontogeny: a developmental history describing the birth and maturation of a single organism. Where a genealogy describes the deep history of a lineage, an ontogeny writes the biography of a single entity cut adrift from its lineage. The new mode of history writing, in this vein, took form as the biography of nations, a fitting subject for an age that saw the rise of nationalism and the emergence of universal education. Through the metaphor of ontogeny, it became possible to imagine that national histories have founding moments and key transitions. Surveying the histories written in France, England, the United States, and elsewhere in the West in the decades leading up to 1900, it is striking how histories written in a semi-genealogical mode gave way, over the space of several decades, to histories rife with metaphors of origin and birth.[footnote]
In general, see Ernest Breisach, *Historiography: Ancient, Medieval and Modern*, 2nd ed. (Chicago: University of Chicago Press, 1994). The shift in patterns of historical writing, and in particular the transformation in the underlying biological metaphors used to describe the pattern of history, merit further research. For a preliminary study, see my “Genealogy, Ontogeny, and the Narrative Arc of Origins,” forthcoming.

All national history curricula have their own roots in the late nineteenth century, in the work of figures like Victor Duruy, George Park Fisher, and other historians who were instrumental in defining the patterns of history instruction. It is understandable that history curricula, then as now, should emphasize moments of national origins. Nations, after all, are bodies. But leaving aside nations, what was the birth date for history as a whole? In the first half of the twentieth century, this was an issue of some moment in the United States, as many universities adopted “Western Civ” as their basic history course. In the 1920s, the Australian archaeologist Gordon Childe offered historians the twin ideas of the Neolithic Revolution and the Urban Revolution in Mesopotamia, and his style of periodization spread rapidly through U.S. textbooks, general histories, and curricula from the 1930s

onward. The current Social Studies curriculum in New York State, for example, begins officially in Mesopotamia in 4,000 B.C. In Texas, no dates are given for some of the early happenings, but the earliest subject covered is the "Neolithic Agricultural Revolution."[footnote] In almost all Western Civ and World History textbooks today, history comes into being in the Neolithic.

See http://www.emsc.nysed.gov/ciai/socst/pub/sscore2.pdf, page 94, accessed 28 December 2009; Texas Administrative Code, Title 19, Part II, Chapter 113, Texas Essential Knowledge and Skills for Social Studies, Subchapter C, High School, p. C-15; see http://ritter.tea.state.tx.us/rules/tac/chapter113/index.html, accessed 11 September 2009.

The Paleolithic, in this mode of writing, is a historyless period: a prologue. The idea that some human societies could exist outside of history intrigued nineteenth-century German historical philosophers. In Leopold von Ranke's famous phrase, Asians were the "people of the eternal standstill."[footnote] So were Africans, Australian Aborigines, American Indians: indeed, practically everyone who wasn't of European origin. It was an odd feature of the new history that historicity, if it was to be accorded to some peoples, had to be denied others.

See Arthur F. Wright, "The Study of Chinese Civilization," *Journal of the History of Ideas* 21 (1960): 233-55, here 245.

The idea that only some peoples have history is blatantly erroneous. You don't have to have much acquaintance with Paleolithic and Neolithic archaeology, let alone Incan and African archaeology, to realize that all human societies are full of history, even those whose histories we must reconstruct with the most fragmentary unwritten evidence. Thanks to the ontogenetic style of writing history, however, the idea that there is a time before history, and then a history, has worked its way into our curricula and our habits of thinking about the past. The errors into which this has led us have been legion. In recent years, we have swept away the instinct to deny historicity to non-Europeans; except, of course, where Paleolithic peoples are concerned.

In proposing a deep history there is a temptation to prescribe. We *ought* to have historians, archaeologists, and anthropologists in a single department. We *ought* to work in teams so as to bridge the methodological divisions that break human history into pieces. Most of this is so obvious as to need no comment; it's the implementation that would be complicated. Before we set about the task of restructuring academic space, the intellectual architecture must be solidly constructed. The first task is to define the narrative arc of a deep history, something that clearly baffled Duruy and generations of textbook authors after him.

The narrative arc of modern history-writing, as noted above, follows the arc of ontogeny. As a practical matter, what this means is that histories—especially but not exclusively works of synthesis such as textbooks, general histories, and introductory survey lectures—frame their subjects using metaphors of origin, birth, roots, revolution, invention, and the like. The key feature of the ontogenetic metaphor is that it proposes a shift from nothingness to being or from stasis to change, a shift projected onto a moment of birth or conception. The nation was an early target for the ontogenetic metaphor: by the late nineteenth century, the idea of the birth of nations was making its way into chapter titles, section headings, and book prologues. The metaphor eventually found its way into book titles, such as Ferdinand Lot's famous 1948 work, *The Birth of France*.[footnote] But the metaphor was readily exported for use in other areas. Western Civilization (via the Neolithic Revolution) was an early beneficiary, and the metaphor soon spread beyond this to other entities, ideas, and systems. Over the last fifty years, the list has become long indeed: for medieval Europe alone, claims have been made identifying the period as the point of origin for civil society, the state, commerce and trade, banking, cities, individualism, universities, the modern nuclear family, scientific method, law and justice, human rights, citizenship, colonialism, fashion, and even persecution.
Victor Henri Ferdinand Lot, *Naissance de la France* (Paris: Fayard, 1948).

The ontogenetic metaphor struck a chord in the historical imagination of the latter half of the twentieth century. Books using ontogenetic metaphors became foundational texts. For medieval European history, such works as Robert S. Lopez's *The Birth of Europe* and Joseph Strayer's *On the Medieval Origins of the Modern State* spring to mind.[footnote] Even a

cursory bibliographic examination will show that recourse to talk of birth and origins has become dense in all fields of history in recent decades. [footnote] Used in titles or massaged into the architecture of arguments, ontogenetic metaphors help create the energy that can drive whole fields of historical inquiry, as scholars engage in fierce debates about the points of origins of human rights, intolerance, or the modern world system. Yet the use of the metaphor comes with a price. An evocation of birth can project nothingness or historylessness onto the other side of the divide. It flattens the long tail of history before the origin into an inconsequential prelude.
Robert S. Lopez, *The Birth of Europe* (New York: M. Evans, 1962); Joseph S. Strayer, *On the Medieval Origins of the Modern State* (Princeton: Princeton University Press, 1970).
Typical titles include Immanuel M. Wallerstein, *The Modern World-System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (New York: Academic Press, 1974); Neil McKendrick, Jon Brewer, and J.H. Plumb, *The Birth of a Consumer Society: The Commercialization of Eighteenth-Century England* (Bloomington: Indiana University Press, 1982); Christopher A. Bayly, *The Birth of the Modern World, 1780-1914: Global Connections and Comparisons* (Oxford: Blackwell, 2003); Lynn Hunt, *Inventing Human Rights: A History* (New York: Norton, 2007). Ontogenetic metaphors don't always appear in book titles, though they are evident in arguments, e.g. Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, trans. Thomas Burger with the assistance of Frederick Lawrence (Cambridge: MIT Press, 1989); Thomas Laqueur, *Making Sex: Body and Gender from the Greeks to Freud* (Cambridge, Mass.: Harvard University Press, 1990); Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton: Princeton University Press, 2000); Gregory Clark, *A Farewell to Alms: A Brief Economic History of the World* (Princeton: Princeton University Press, 2007).

Ontogeny, clearly, is anathema to a deep history of humankind. More to the point, if we must have origins, they ought to be human origins rather than the ersatz and self-congratulatory origins associated with modernity. The modern practice of history has borrowed its signature metaphors from biology, and biology, once again, provides a metaphorical alternative: that

of phylogeny. Where ontogeny is a biographical vision, focusing on the life history of organisms or systems, phylogeny is a lineal vision describing a succession of changing forms. Ontogeny generates historical myopias and illusions of novelty. Historians who incautiously retail metaphors of birth and origin are liable to imagine that world trade systems were insignificant before the sixteenth century, that mass consumption did not exist before the eighteenth century, that egalitarian and democratic ideas could not have existed before 1789, and so on. Phylogenetic styles of writing history, in contrast, see broad continuities in various domains even while acknowledging that the Paleolithic amber trade was not as vast as the modern diamond trade, that patterns of consumption in ancient Rome took different forms than they do today, and that forager egalitarianism is not like modern democracy. Change is always more visible, and more interesting, when viewed against an invariant background. The most significant difference between ontogeny and phylogeny lies in the fact that phylogeny presupposes a constant dialogue between humans and the ecosystems of which they form a part. In this view, many of the events and trends that pass as novelties in the ontogenetic style of writing history turn out to be normal ecological processes dependent on things like population density and the distribution of resources. Deep histories coalesce easily around the narrative spiral that emerges when one imagines a constant evolutionary dialogue between organism and ecosystem, where the organism itself is constantly shaping and reshaping the very ecosystem of which it is a part, and the ecosystem, in turn, constantly shapes the organism.

Since an example might help explain what I mean by this narrative spiral, let us reflect for a moment on the human body, one of many domains of inquiry that provide a ready base for a deep historical perspective. Animal bodies are always undergoing physical changes, as natural selection tunes the body to a changing environment; if the changes are substantial enough, a new species results. Contemplating the human body from Homo habilis forward, physical anthropologists have described a set of transformations that resulted from the growing human propensity to use tools, where tool-use, by changing the way in which humans released calories from foodstuffs, generated feedback effects on the body itself.[footnote] The human evolutionary biologist Richard Wrangham has vividly argued that

the harnessing of fire (a special kind of tool) some 1.8 million years ago explains an especially important cascade of transformations that dramatically reshaped the body of Homo erectus and altered human sociality.[footnote] As digestion increasingly took place outside the stomach, through cutting, pounding, and especially cooking, the gut itself shrank, along with the jaw, the teeth, and the muscles associated with biting. The body itself became less robust. Strikingly, many of the bodily devices that primates use to send social signals atrophied or vanished in hominins at around the same time: canines and bristly hair, for example, used by dominant males to maintain social hierarchies and (probably) the pheromones or swellings that indicate oestrus in females. The new human body suited the egalitarian social structure that was itself a product of fire and tool use.[footnote]

A standard work here is Richard G. Klein, *The Human Career: Human Biological and Cultural Origins*, 3rd ed. (Chicago: University of Chicago Press, 2009).

Richard G. Wrangham, *Catching Fire: How Cooking Made Us Human* (New York: Basic Books, 2009).

In general, see Christopher Boehm, *Hierarchy in the Forest: The Evolution of Egalitarian Behavior* (Cambridge, Mass.: Harvard University Press, 1999).

This doesn't mean that displays disappeared. One of the most striking features of the archaeological record since the Upper Paleolithic (ca. 50,000 years ago) has been the growing density of human-made devices for extending or redefining the edges of the human body through ornaments, clothes, weapons, and (probably) tattoos; later, these devices extended to shoes, armor, pierced ears, smoothly shaven faces and legs, perfumes, wigs, and, eventually, plastic surgery. The changing forms of display and the transformations in material culture that underpin them are the result of many factors, one of which was the return of social hierarchy, albeit in a different form. Hierarchy, in turn, was a product of increasing population densities, an ecological factor linked to changing patterns of food production as well as climate change.

Sketched out above is just a glimpse of how we might write a history narrating the long phylogenetic dance among body, society, and ecosystem.

Developed in a more robust form, this kind of narrative spiral could link the physical anthropology of the hominin body to postmodern studies of the body as a social construct. In a sense, what the history reveals is that the body has *always* been a social construct, regardless of whether culture's influence operated indirectly, via transformations in the genotype, or directly on the body itself. The idea of a deep history is that a similar approach, eschewing ontogeny, can apply in a wide array of human domains, such as patterns of migration and colonization, material culture, foodways, family, gender and sexuality, communication, political forms, economic exchange, music, religion, and so on.

In his famous formulation, the biologist Ernst Haeckel proposed that "ontogeny recapitulates phylogeny," namely, that the biological history of a species is mirrored in the successive forms taken by one of its members as the organism develops from fetus to adult. The theory itself was suggested by fish-like gill slits found in human and other tetrapod fetuses. Though recapitulation in this sense has long since been abandoned as a plausible biological theory, it has had a strangely persistent after-life in the discipline of history. History's continuing reliance on ontogenetic metaphors of birth, origins, and roots, which have become increasingly common in recent historical writing, suggests how the field as a whole operates under the belief that the only history worth telling is the biography of the most recent organism within the lineage, such as the nation or the modern world system. A deep history is an antidote to this strangely compressed and shallow understanding of human historical time, a view of history that seeks to make history historical again.

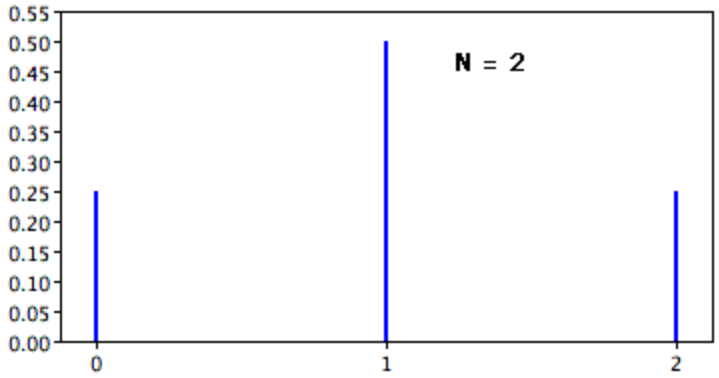
History of Normal Distribution

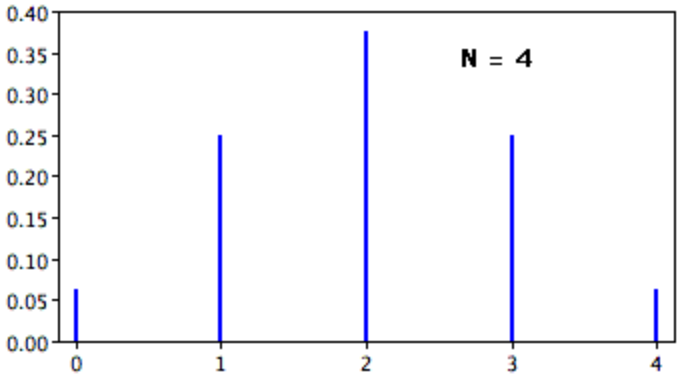
In the chapter on probability, we saw that the binomial distribution could be used to solve problems such as "If a fair coin is flipped 100 times, what is the probability of getting 60 or more heads?" The probability of exactly x heads out of N flips is computed using the formula:

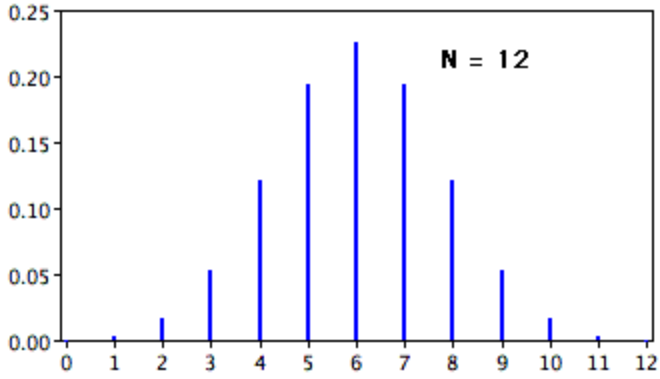
$$P(x) = \frac{N!}{x!\,(N-x)!}\pi^x(1-\pi)^{N-x}$$

where x is the number of heads (60), N is the number of flips (100), and π is the probability of a head (0.5). Therefore, to solve this problem, you compute the probability of 60 heads, then the probability of 61 heads, 62 heads, etc, and add up all these probabilities. Imagine how long it must have taken to compute binomial probabilities before the advent of calculators and computers.

Abraham de Moivre, an 18th century statistician and consultant to gamblers was often called upon to make these lengthy computations. de Moivre noted that when the number of events (coin flips) increased, the shape of the binomial distribution approached a very smooth curve. Binomial distributions for 2, 4, and 12 flips are shown in [link].



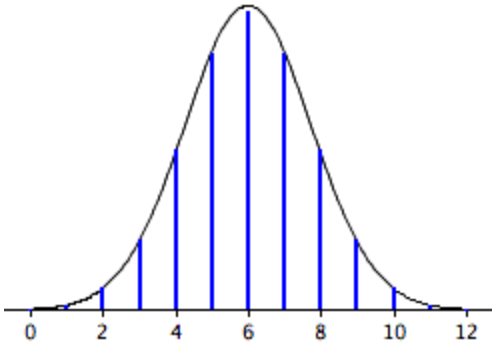




Examples of binomial distributions. The heights of the blue bars represent the probabilities.

de Moivre reasoned that if he could find a mathematical expression for this curve, he would be able to solve problems such as finding the probability of

60 or more heads out of 100 coin flips much more easily. This is exactly what he did, and the curve he discovered is now called the **normal curve**.



The normal approximation to the binomial distribution for 12 coin flips. The smooth curve is the normal distribution. Note how well it approximates the binomial probabilities represented by the heights of the blue lines.

The importance of the normal curve stems primarily from the fact that the distribution of many natural phenomena are at least approximately normally distributed. One of the first applications of the normal distribution was to the analysis of errors of measurement made in astronomical observations, errors that occurred because of imperfect instruments and imperfect observers. Galileo in the 17th century noted that these errors were symmetric and that small errors occurred more frequently than large errors. This led to several hypothesized distributions of errors, but it was not until the early 19th century that it was discovered that these errors followed a normal distribution. Independently the mathematicians Adrian in 1808 and Gauss in 1809 developed the formula for the normal distribution and showed that errors were fit well by this distribution.

This same distribution had been discovered by Laplace in 1778 when he derived the extremely important **central limit theorem**, the topic of a later section of this chapter. Laplace showed that even if a distribution is not normally distributed, the means of repeated samples from the distribution would be very nearly normal, and that the the larger the sample size, the closer the distribution would be to a normal distribution. Most statistical procedures for testing differences between means assume normal distributions. Because the distribution of means is very close to normal, these tests work well even if the distribution itself is only roughly normal.

Biographical Information for:

- de Moivre
- Gauss
- Laplace

The Emmigration of Foreign Workers to Spain: A New and Relevant Phenomenon in the History of Spain
Since American colonization, Spain has traditionally been an emitting country of emigrants until the 1970s. At that time Spain became, for the first time, a receiving country of immigrants. The immigrants arrive to rich and developed Europe and are seen as cheap manual labor in search of the promised land that flows with milk and honey. Unfortunately, they are eventually hit with others' lack of understanding and racism. Increasing immigration in Spain by people of different cultures, religions, and nationalities constitutes a challenge and defies Spanish society, not only in its economic, social, and cultural aspects, but also in the ethical and moral aspects. If Spaniards do not learn to coexist together as natives and immigrants, an increase of racism and xenophobia is sociologically foreseeable, bringing about interethnic conflicts.

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The Emmigration of Foreign Workers to Spain: A New and Relevant Phenomenon in the History of Spain

Tomás Calvo-Buezas

Since American colonization, Spain has traditionally been an emitting country of emigrants until the 1970s. At that time Spain became, for the first time, a receiving country of immigrants. The immigrants arrive to rich and developed Europe and are seen as cheap manual labor in search of the

promised land that flows with milk and honey. Unfortunately, they are eventually hit with others' lack of understanding and racism.

Increasing immigration in Spain by people of different cultures, religions, and nationalities constitutes a challenge and defies Spanish society, not only in its economic, social, and cultural aspects, but also in the ethical and moral aspects. If Spaniards do not learn to coexist together as natives and immigrants, an increase of racism and xenophobia is sociologically foreseeable, bringing about interethnic conflicts.

The history of civilizations is the history of human immigration. Humans are likely the most migratory beings on the planet. In previous evolutionary phases, there was the domestication of plants and animals, the creation of hierarchies and imperial military societies bringing about conquests, the control of other towns, and consequent migrations, which have created more and more multiethnic spaces.

European conquest and colonialism, related to industrial and commercial development, consistently opened byways between different towns and cultures, increasing the capitalist market and mass media which result in today's massive tourism, international migration (200 million people), and the 50 million refugees because of wars and starvation. The Europe of the 21st Century will be an even more multiracial mosaic, a Europe fertilized with immigrants and ethnic groups of the Third World with very different ways of life from those of western culture. Spain also walks the way of multiculturalism and ethnic-racial pluralism. Spanish society is no longer a traditional, ethnic, and culturally homogenous society regarding uniform values and beliefs.

The old demons of fascism and racism have returned to the European scene, surprising those who believed that conceited narcissistic beliefs had been left behind, buried within the cultured, democratic Europe. It is because gods, like demons, sleep, but do not die. For that reason, everyone in Europe is frightened by those extreme political forces that, throughout serious and real problems like those of unemployment, citizen insecurity, and drugs, urge ample sectors to look for scapegoats; i.e., the poor and the weak, upon which they can discharge their frustrations. A dangerous nationalism is arising in Europe that perceives foreigners, singularly the

Maghribian, and those of the Third World as *the new Barbarians*, increasing the ethnocentric and closed-minded yell of *Europe for the European*! The terrorist massacres of September 11, 2001, in New York, and March 11, 2004, in Madrid, have generated even more rejection toward immigrants, particularly Moroccans. The current phenomenon of international migration must be contextualized within the world-wide process of economic globalization, social inequality, and demographic imbalance.

The Structural Causes of International Migration: A Globalized, Unjustly Distributed, and Demographically Unbalanced World

Until now society had not comprised all of humanity into a global village, interrelated by means of communication and characterized by integration, universalism, and globalization. The world has become a great plaza with people of all races and cultures, and a great market with a large flow of capital, technology, resources, companies, and products. Some analysts have explained the increase of this universalistic integration, among other factors, with the triumph of liberal capitalism, of transnational and expansionistic nature; this would explain the rupture of closed ethnic and cultural borders. With the fall of communist states, prevailing capitalism could have developed a more universalistic, integrating and globalizing dimension. However, the expansion of world-wide capitalism produces other effects such as social segregation, fanatical nationalistic resistance, and the ethnic particularistic bastion. Why do these opposite processes to the universalistic globalization exist? Because capitalism integrates production and the market while increasing competition between the diverse social sectors and countries, and separating the northern and southern parts of the country even more: it creates a hierarchy of unequal structures of economic power into the hands of the industrialized rich countries. This process debilitates the national sovereignty and loyalties of ethnic groups and religions which is the reason why at times these social forces explode in exaggerated ethnic fanaticism, nationalism, or religion. In this sense some authors speak of how our modern society of consumption operates simultaneously a universalistic process of certain economic,

cultural, and social homogeneity that could metaphorically detribalize nationalistic structures while simultaneously producing a convex image, an inverse particularistic, ethnocentric, and nationalist process of symbolic tribalization of ethnic identity.

Knowing how to harmonize the open universalistic dimension and the convenient ethnic loyalty and patriotism presents challenges for the future. Loyalty conflicts, competition of resources, ethnic-national particularism, and rejection of the *other* have increased, reintroducing the old prejudices and the search for scapegoats. In the midst of these social crises, the people must maintain clear heads and open hearts.

Globalization receives criticism for being an inexorable phenomenon which (a) rejects market dictatorship, (b) culturally homogenizes, and (c) promotes cultural biodiversity and humanizing thought. Susan George, Director of the Transnational Institute de Amsterdam, noted:

Only now, and perhaps during the industrial revolution in Great Britain, have we legitimized the market to decide over our lives. And if we leave them alone, they will not only destroy Earth, but their systems will only allow that richest 5% of the world to subsist. As they say, take the best and throw away the rest (Country, 27-I-2000).

The economic *trash* of the world today, comparing northern and southern Spain, is constituted by millions of human beings, who in the midst of the 21st century, experience hunger and suffering for not being able to satisfy their minimum necessities. The UN has the responsibility of telling the world the current situation of the inhabitants of this planet every year. The UN's extensive 1998 extensive report confirms the process of the concentration of wealth. The 225 richest people accumulate a wealth equivalent to what the 2.5 billion poorest inhabitants (47% of the population) own. The inequalities reach frightening levels: the three richest people of the world, Bill Gates, the Sultan of Brunei, and Warren E. Buffett, have assets that surpass the GIP (Gross Interior Product) of the 48 least advanced countries (600 million inhabitants) combined. Viewing things in another light, 20% of the population control 86% of the world-wide wealth, and 1.3 billion poor people live on an income of less than a dollar daily. Goods owned by the 358 richest people are more valuable that the annual

rent of 2.6 billion inhabitants. With so much wealth in some countries and increasing amount of poverty in others, how can one be surprised of migrations and the pilgrimage to the promised land of the North that is so fantastically portrayed in the Third World by modern televisions, which are the bread and opium of the town for so many million poor men in the world. A structural reason that must be considered when analyzing international migration is the great imbalance of increases in population between the developed countries and those of the Third World.

After the factors of the accelerated and successful European industrial development of the 20th century, and with the fatalities of the two World Wars, Europe has a population of few children and many elders. Meanwhile, the Third World has experienced a vertiginous increase in population. Though the economically poor countries are very rich in demographic resources, young populations with abundant capacity to work, there is no type of employment. This fact grants a structural cause for international migrations. The demographic forecasts for the future, although it is necessary to take the data with certain reservations, are as follows.

According to the sources of the report of the United Nations (UN), Spain, with the lowest rate of fecundity in the world (1.07 children by woman in a fertile age), would have 30,226,000 inhabitants in 2050. That is less than the 39,628,000 it had in 2002, which had increased to 42,197,000 million in 2004 thanks to the increase of immigrants, which were more than 600,000 in 2003. In 2003, Spain took in one out of three people who immigrated to the European Union.

According to the division of population among the United Nations, the forecasts of population for the year 2050, comparing present population and the foreseeable one in 2050 by demographic zones, would be the following: Europe (present 727 million) anticipated for 2050, 603 million (-124 million); North America (present 314 million) anticipated for 2050, 438 (+124 million); South America (present 519 million) anticipated for 2050, 806 (+287 million); Africa (present 794 million) anticipated for the year 2050, 2 billion inhabitants (+1.206 million); Asia (present 3.7 billion) anticipated for the year 2005, 5.4 billion (+1.750 million).

The differences between the developed first world and the third world are evident, although these forecasts are exposed to many variations in such a big gap. For Spain, the population variations are of 39,600,000 inhabitants in 2000; 36,600,000 in 2025; and 30,200,000 in 2050. Spain, according to these forecasts, would need 12 million immigrants by 2050.

The variations of population between Europe and Africa are remarkable: after World War II, Europe represented 22% of the world-wide population and Africa only 8%. Now the two zones have the same proportion of 13%. Nevertheless, by the year 2050, Africa will be three times more populated than Europe. With reference to Spain, these data are significant: 50 years ago, Spain had a population three times bigger than Morocco; whereas within half a century, Morocco will have 60% more inhabitants than Spain.

Why be surprised then that half of the Arab adolescents wish to immigrate and leave their countries? Of the 2.8 billion inhabitants of the 22 African-Arab countries, 38% of the members of that population are less than 14-years-old. Morocco at the moment has about 30.5 million inhabitants, where 19% of the people are below the poverty threshold, occupying 123rd position (of 173) in an Index of Human Development (Spain has 21st). Fifty percent are illiterate. The percentage of unemployment among Moroccans between the ages of 15 and 34 is that of 50%, and every year Morocco need to employ 250,000 new young people. The birth-rate is 3.05 children per woman, while Spain's is 1.05 children per woman. There are 3 million Moroccans living away from their country; 300,000 of these immigrants are in Spain. Moroccans form the most numerous national group of foreigners in Spain, followed by the Latin Americans, who are driven to immigrate by the same structural factors previously mentioned: a globalized international market in capital, resources, and work; an unjust division between the North and South; a world-wide demographic imbalance and countries of origin with serious problems of poverty, political corruption, or citizen insecurity.

Spain for the First Time in Its History: Change from an Emitting to Receiving Country of Immigrants

The increase of immigration in Spain has been happening at a remarkable rate, mainly in the last four years, as it can be seen in the graph in Figure 1.

Figure 1. Evolution of the resident of foreign population in Spain.

Source**:** National Institute of Statistics (NIS). 2005

The total number of immigrants regularized at the beginning of 2005 was 3,691,547, which entails 8.4% of the 40 million Spanish populations. It would be necessary to add the people regularized during the first months of 2005, which would be about 4 million regularized immigrants, and an undetermined number of undocumented people, who some estimate at about half a million.

Immigrants concentrate themselves mainly in 5 of the 17 autonomous communities in Spain. Madrid and Catalonia have just about half of all immigrants, and if the following are added, the Valencia Community, Andalusia, and the Canary Islands, it would add up to 80% of all immigrants in Spain.

According to Figure 2, immigrants of American nationalities are the greatest contingent of 1,460,176 regularized people, which almost adds to 40% of all foreigners, exactly 39.6%. Of these, Ecuador is the greatest national group of Latin American immigrants (491,797), which is 13.3% of the total population of immigrants. Following it is Colombia, with 268,931 (7.3% of the total number of immigrants), Argentina with 151,878 (4.7%), Bolivia with 96,844 (2.6%), and Peru with 84,427 (2.3% of the total number of immigrants) in Spain.

Figure 2. Resident foreigners in Spain by areas of origin.

Source:National Institute of Statistics (NIS). 2005

The second group, by nationalities, would be the Europeans with 1,336,214 foreigners, (36.2% of the total immigrants). From the European Union (25 countries), 766,678 (20.8%) of the total foreigners are in Spain, surpassing the United Kingdom (224,841 foreigners) and Germany (131,887). And 561,476 are foreigners of other European countries (15.2% of the total number of immigrants), the most numerous being Romania with 314,349 (8.5% of the total number of immigrants), followed by Bulgaria with 91,339 (2.5%). African nationalities would be the third group, with 705,944

(19.1% of the total number of foreigners); Morocco being the most numerous national group with 505,373, again surpassing Ecuador (491,797), and representing 13.7% of the total of foreigners in Spain. There are 186,227 foreigners of Asian nationalities (5.0% of the total number of foreigners), the Chinese being the most numerous with 86,681 immigrants, adding to 2.3% of the total number of immigrants. In Oceania there are 2,284 foreigners (0.1% of immigration). (See Table 1 and Figure 3).

Table 1. Foreigners in Spain according to Nationality, to January 1, 2005

Total	**3.691.547**	**100.0**
European Nationalities	**1.336.214**	**36.2**
European Union (25)	766.678	20.8
United Kingdom	224.841	6.1
Germany	131.887	3.6
Italy	94.464	2.6
France	76.949	2.1
Portugal	65.611	1.8
Poland	35.962	1.0
Holland	33.554	0.9
Belgium	26.388	0.7

Other European countries	561.475	15.2
Rumania	314.349	8.5
Bulgaria	91.339	2.5
Ukraine	65.096	1.8
Russia	35.942	1.0
African Nationalities	**705.944**	**19.1**
Morocco	505.373	13.7
Algeria	45.791	1.2
Senegal	29.334	0.8
Nigeria	26.877	0.7
American Nationalities	**1.460.176**	**39.6**
Ecuador	491.797	13.3
Colombia	268.931	7.3
Argentina	151.878	4.1
Bolivia	96.844	2.6
Peru	84.427	2.3
Dominican Republic	56.421	1.5
Brazil	53.736	1.5

Venezuela	48.740	1.3
Cuba	44.594	1.2
Uruguay	42.062	1.1
Chile	35.579	1.0
United States	25.576	0.7
Asian Nationalities	**186.227**	**5.0**
China	86.681	2.3
Pakistan	31.652	0.9
Oceania	**2.284**	**0.1**
Apátrias	702	0.0

Source:National Institute of Statistics (NIS). 2005.

Figure 3. Main countries of origin.

Source:National Institute of Statistics (NIS). 2005.

The number of undocumented people in Spain at the beginning of 2005 was considered to be approximately one million, emphasizing the positive action of the present government who has undertaken a successful process of regularization of 700,000 people in 2005. However, the immigration of undocumented people continues to increase in Spain.

A study, "Immigration in Spain," by the Foundation of Saving Funds (FUNCAS), published in *Papeles de Economía* (January 2004), predicted that more than one fourth of those who reside in Spain in 2015 will be immigrants. According to the study, in 2015 there will be 11.7 million foreigners, which is 27.4% of Spain’s population; by then that will be about

43 million inhabitants. Spain will take five years to double its present foreign population (2.3 million registered), having in 2008, 4.6 million immigrants, with increasing migrations of other origins than that of Europeans. According to the study, economic consequences are very positive: its rate of activity is 16.5 points over the average Spanish and already represents 5.14% of those affiliated with Social Security. According to a January, 2004 report given in *El País*,each foreigner sends an average of 322 euros monthly, which is about 2.3 billion euros annually as remittance of the immigrants to their countries. In comparison with Europe, here are data to reflect and compare: in Germany there are 7.3 million foreigners (9% of its population); Austria has a 9.1% of foreigners; Belgium, France, Holland, and England each have around 9%; and Sweden has 11.3% of foreigners.

Madrid has the greatest percentage of immigrants in Spain (13%). It has increased since 1997 from 3% to 13% of immigrants in reference to the total population; but Berlin has 13%, Paris 16%, London 20%, Toronto, Canada has 40%, New York 56%, and Los Angeles 64% of population of immigrants, although many of them are already citizens and legal residents.

And where do immigrants work? Of the 80% of jobs that the Spaniards do not want because of wages and working conditions, 33% are in the farming sector and collection of harvests, 20% are in domestic work and attention to the sick and elderly, 15% in construction, 12% in the catering business (kitchen/waiting), and 20% in other jobs. Figure 4 demonstrates types of immigrant positions.

Figure 4. Jobs of immigrants.

Source:National Institute of Statistics (NIS).

The Height of the Islam Phobia after September 11, 2001 and March 11, 2004

Given the height of fear against Islam in the last decade that has increased considerably after the terrorism attack of September 11, 2001, on New York, and the criminal attempt of March 11, 2004, in Madrid, the dialogue

between Islam and Christianity has become one of the greater challenges of 21st century. The terrorist massacre of March 11 in Madrid terrified the minds and hearts, not only of the Madrilenians and Spaniards, but of all people of good will in the world. Pain, rage, disgust, physical, and moral sentencing were, and still are the feelings shaped deeply in the *spoken* silence, in symbolic fires, and in the massive rituals of symbolic rebellion and fraternal communion with the victims. There will be in the history of Spain a before and after this date; a date with limits and symbolism that began with the televising of the horror of September 11 in New York. In those three diachronic years (2001-04), there was a war in Arabic territory, an invasion, thousands of deaths, as much of crossed Christians and Islamic fanatics with the hatred of violent Jews and Palestinians. In this cruel and fratricidal atmosphere, within a structure of inequality and world-wide injustice between few very rich countries (mainly western), and between many very poor countries, it is very difficult to construct a world with peace, justice, freedom, democracy, solidarity, equality, and brotherhood. Nevertheless, that is the human obligation and destiny if the human species wants to survive in a single world and common globalized home in justice and freedom, enriched with the plurality of cultures and religions of the world.

The challenge of the 21st century is the dialogue between Islam and Christianity, between East and West, exiling as much fanatical violent hatred to the crossed Christian, like anti-Islamic western fundamentalism, legitimized by pseudo-thinkers like Huntington (1997). According to what I wrote after the massacre of New York (2001) and before the terrorist attack of Madrid (2004):

The problem is not in that diverse civilizations exist, different religions, or diverse cultures, whose plurality is good for all humanity. The trouble is not in Islam, Judaism, nor in Christianity. It is in idolatrous perversion, and assassination of a legitimate religion (whichever that might be), but we perverted, rotted, and transformed it substantively into an idol, that turns the different ones into enemies that have to be exterminated. The profligate of Bin Laden is to assassin, using a religion in itself, which he perverts to ideologize and legitimize his fundamentalist violent fanaticism and his monstrous dreams of terror. That is not the religion of the immense majority

of the 1.2 billion Muslims in the world, which has a pacifist front and teaches not to kill. That type of perverse interpretation of Islam does not identify the immense majority of its Arabic religious leaders, who have condemned the terrorism of September 11, 2001 (Buezas, 2001).

La Opinión Pública of Spain, political institutions, social actors, and the Spanish townspeople all have proclaimed a unanimous speech, forceful and firm, condemning the terrorist authors and unloading the blame on other foreigners, who might have that same nationality, religion, and culture. At a public level, Spanish society and its institutional actors of the same diverse ideologies and identities before a tragic and painful commotion have avoided the easy path of the search for scapegoats on which to unload their fury, hatred, and pain for they could be immigrants in general and the Moroccans particularly. However, that proclaimed public speech cannot simultaneously coexist with other moods and feelings even more ambivalent and ambiguous, inclined to the xenophobia against immigrants, and mainly the peak of the already existing distrust against the Moroccans and against Islam. To discover this is the objective of an investigation that we are undertaking.

The height of Islam phobia in Europe and Spain, in contemporary times, has not appeared after the terrorism of September 11, 2001, and of March 11, 2004. Singularly, after the presence of Maghribian in France and Turks in Germany, and after the fall of the wall of Berlin, Islam phobia— a common universal enemy, diffused and exterior— replaced, in the imaginary free and Christian west, the Coco of Communism, and in Spain, the liberalism and masonry, as well as the Communism.

The Council of Europe, through the European Commission against Racism (ECRI), published in 1999 a document warning of the boost of Islam phobia in Europe. In Spain, the murder of a Moroccan in Madrid on June 21, 1997, by an ex-guard civilian and the xenophobe doings of *El Ejido* (February 2000), along with other multiple aggressions, are the tip of the iceberg of that imaginary prejudiced anti-Moor that is manifested in my scholastic surveys as the group of foreigners against whom children and adolescents show more distrust and rejection: 11% would throw them to the Moor-Arabs of Spain in 1986, and 27% in 1997 (Buezas, 2000). Our hypothesis is

that after September 11, 2001, and March 11, 2004, that percentage has increased, surpassing even the gypsies, who have always been in my scholastic surveys, and in the studies of ASEP and of CIS, the most rejected group in Spain.

In a way, some authors, perhaps without trying, have contributed to some border characteristics and very diverse ideological slopes, but that come together in a very negative position against Islam and Islamic immigrants, which they visualize as non-integrated partners in the western democratic society. I am talking mainly about S. Huntington with his *Clash of Civilizations* (1997) and libel against the Mexican threat to the U.S. Helmut Schmidt, former president of Germany (2002) warned that Europeans must respect the cultural and religious identity of Islamic neighbors because of the 12 million European Muslims, 300 million surround us and there are 1.3 billion in the world; at the end of the century there will be as many Turks as French and Germans combined.

In this dialogue of Islam and Christianity, the church has many things to say and do. In Spain, the Catholic Church and the Islamic magnates have a long but necessary way to go, not only from the top of the hierarchy, but from the pastoral bases of the parishes and from the evangelists. An example is the combined action of the Episcopal Conferences of Mexico and the United States that have sent their respective governments a proposal to regulate the companies that offer the shipment of remittances that sometimes charge the immigrants up to a 20% for its services.

The Unified Utopia is Possible: We are all Brothers on a Single Earth

The immigration of the Third World to rich countries, and Hispano-Americans to Spain, will be a sign of identity in the 21st century. The challenge of the next millennium is to look for the difficult, but necessary, balance between equality and solidarity, within the framework of a constitutional democracy.

When observing the diversity of *others*, and those who are *different* who arrive to our land, just as for centuries Europeans went to theirs, it is

valuable to finalize this message with the Declaration of the Spanish Committee in the European Year Against the Racism, proclaimed in the Tricultural City of Toledo, on March 13, 1997:

The wealth of Spain and Europe, for centuries, fundamentally nourishes from the diversity of its traditions, cultures, ethnic groups, languages and religions, and of the certainty that the principles of tolerance and democratic coexistence are the best guarantees of the existence of Spanish and European society, open, pluricultural: diverse.

Spain by its historical tradition of coexistence between towns and cultures, by its possession of the Mediterranean, as well as by its ties with Ibero-America, can facilitate the establishment of multicultural models of relation with the immigrants.

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History and Historians
Sed ut perspiciatis

Sed ut perspiciatis, unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam eaque ipsa, quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt, explicabo. Nemo enim ipsam voluptatem, quia voluptas sit, aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos, qui ratione voluptatem sequi nesciunt, neque porro quisquam est, qui dolorem ipsum, quia dolor sit amet, consectetur, adipisci[ng] velit, sed quia non numquam [do] eius modi tempora inci[di]dunt, ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea commodi consequatur? Quis autem vel eum iure reprehenderit, qui in ea voluptate velit esse, quam nihil molestiae consequatur, vel illum, qui dolorem eum fugiat, quo voluptas nulla pariatur?

"Law as...": Theory and Method in Legal History Conference
April 16-17, 2010. Legal historians have long explained law through its relationship to what lies "outside" it: law and society, law and policy, law and economy. What if we imagine them as the same phenomenon - not law and economy, but law as economy (or economy as law)? What of law as art, as science, as war, as peace?

Collaborative Statistics: Change History

This module contains a listing of changes, updates, and corrections made to Collaborative Statistics after its formal release on 15 July 2008 with version 1.17. While you can always access the latest version of the content online, this list is intended for those who have downloaded or purchased an earlier printed copy of the text and wish to review changes that have been published in more recent versions.

Change Number	Description of the Change	Physical Location
v1.21-1	Correction: Decimals have been corrected to four decimal places.	Page 28, Section 1.12.3
v1.21-2	Syntax Alteration: Changed “who” to “that”.	Page 30, Section 1.12.8; Page 30, Section 1.12.9; Page 30, Section 1.12.10; Page 30, Section 1.12.11
v1.21-3	Correction: Changed “5%” to “5.00%” and “93%” to “93.33%”	Page 41, Section 1.12.3

Change Number	Description of the Change	Physical Location
v1.21-4	Correction: Changed “619” to “919”.	Page 89, Solution to Exercise 2.12.5
v1.21-5	Correction: Removed part "g" and renamed part "h" as part "g".	Page 119, Section 3.11.24
v1.21-6	Syntax Alteration: In “Student Learning Outcomes”, the initiatives were changes to the following: “The student will use theoretical and empirical methods to estimate probabilities; The student will appraise the differences between the two estimates; and The student will demonstrate an understanding of long-term relative frequencies.”	Page 124, Section 3.13.1
v1.21-7	Correction: Changed “Variance of X” to “Frequency of X”	Page 134, Section 4.1.4
v1.21-8	Correction: Changed “For the next three question” to “For the next two question”.	Page 164, following Section 4.15.35

Change Number	Description of the Change	Physical Location
v1.21-9	Correction: Changed part “b” to “40th Percentile”.	Page 212, Section 5.10.7
v1.21-10	Correction: Part “a” changed to “Calculate the sample mean and the sample standard deviation for the number of AIDS cases (the data).” Changed part “f” to “Use the distribution in (e) to calculate the probability that the number of AIDS cases is less than 150.” Changed part “g” to “Determine the cumulative relative frequency that the number of AIDS cases is less than 150. Hint: Order the data and count the number of AIDS cases that are less than 150. Divide by the total number of AIDS cases.”	Page 230, Section 6.8.11
v1.21-11	Correction: The answer were changed to the following: “a. The sample mean is 155.16 and the sample standard deviation is 92.1605.”, “e. $N(155.16, 92.1605)$”, “f. 0.4315”, and “g. 0.3408”.	Page 241, Solution to Exercise 6.8.11
v1.21-12	Correction: Solution changed to “0.1928”.	Page 409, Example 10.2, Problem 7

Change Number	Description of the Change	Physical Location
v1.21-13	Correction: Solution changed to “0.0002”.	Page 410, Solution to Exercise 10.7.10
v1.21-14	Correction: Answer for part “h” changed to “Decision: Reject null; The average difference is more than 2 minutes.”	Page 411, Solution to Exercise 10.9.25
v1.21-15	Correction: Table entry (1,3) changed from “3804” to “3692”, and table entry (8,2) changed from “4.9” to “5.0”.	Page 439, Section 11.11.7
v1.21-16	Correction: Answer choice “e” changed to “27,876”.	Page 456, Solution to Exercise 11.11.17

Change Number	Description of the Change	Physical Location
v1.21-17	Correction: Changed the word “student” to “session” (both instances of the use of the word student). Added “What is the y-intercept and what is the slope? Interpret them using complete sentences.” to the “Problem”. The “Solution” was changed to: “The independent variable (x) is the number of hours Svetlana tutors each session. The dependent variable (y) is the amount, in dollars, Svetlana earns for each session.” and “The y intercept is 25 (a=25). At the start of the tutoring session, Svetlana charges a one-time fee of $25 (this is when x=0). The slope is 15 (b=15). For each session, Svetlana earns $15 for each hour she tutors.”	Page 463, Example 12.4
v1.21-18	Correction: Added “h. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 484, Section 12.13.2
v1.21-19	Correction: Added “j. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 484, Section 12.13.3
v1.21-20	Corection: Added “j. What is the slope of the least squares (best-fit) line? Interpret the Slope.”	Page 486, Section 12.13.5

Change Number	Description of the Change	Physical Location
v1.21-21	Correction: Added “k. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 486, Section 12.13.6
v1.21-22	Correction: Added “j. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 487, Section 12.13.7
v1.21-23	Correction: Added “j. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 488, Section 12.13.8
v1.21-24	Correction: Added “j. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 489, Section 12.13.9
v1.21-25	Correction: Added “l. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 489, Section 12.13.10
v1.21-26	Correction: Added “k. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 489, Section 12.13.11

Change Number	Description of the Change	Physical Location
v1.21-27	Correction: Added “j. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 490, Section 12.13.12
v1.21-28	Correction: Added “k. What is the slope of the least squares (best-fit) line? Interpret the slope.”	Page 490, Section 12.13.13
v1.21-30	Syntax Alteration: Changed the word “total” to “average” in parts “d”, “e”, and “f”.	Page 494, Section 12.13.20
v1.21-31	Correction: Added “j. Slope= -0.0432. As the year increases by one, the welfare family size decreases by 0.0432 people.”	Page 507, Solution to Exercise 12.13.3
v1.21-32	Correction: Added “k. slope=0.0371. As the number of ounces increases by one, the cost of the liquid detergent increases by $0.0371 (or about 4 cents).”	Page 508, Solution to Exercise 12.13.9

Change Number	Description of the Change	Physical Location
v1.21-33	Correction: Added “k. slope=0.5463. As the net taxable estate increases by one dollar, the approximate probate fees and taxes increase by 0.5463 dollars (about 55 cents).”	Page 508, Solution to Exercise 12.13.11
v1.21-34	Correction: Added “k. slope=7.0948. As the age of an American boy increases by one dollar, the average height increases by 7.0948 cm.”	Page 508, Solution to Exercise 12.13.13
v1.21-35	Correction: Changed “p-value=0.0003” to “p-value=0.0006”.	Page 530, Solution to Exercise 13.9.13
v1.21-36	Correction: Question and answers changed to: “What is the error bound for the 90% confidence interval of the true average age?” “A. 11.2, B.22.3, C.17.5, D.8.7”	Page 543, Section 14.2.11
v1.21-37	Correction: Repaired y-hat issue. Now displays as “$\hat{y}$”.	Page 572, Row 6 from the bottom.

Change Number	Description of the Change	Physical Location
v1.21-38	Correction: The denominator has been changed from “$\sqrt{n\pi}\Gamma\left(\frac{n+1}{2}\right)$” to “$\sqrt{n\pi}\Gamma\left(\frac{n}{2}\right)$”	Page 573-4, Formula 14.11
v1.21-39	Correction: Solution changed to “8.7”	Page 577, Solution to Exercise 14.2.11
v1.21-40	Correction: Solution changed to “$\frac{7}{9}$”	Page 577, Solution to Exercise 14.2.16

Listing of Changes Between Print Versions 1.21 and 1.25

Change Number	Description of the Change	Physical Location

Change Number	Description of the Change	Physical Location
v1.17-1	Syntax Alteration: Replaced "Be detailed." with "Make the description detailed."	Page 31, Exercise 1.12 13-14.
v1.17-2	Syntax Alteration: Replaced "What was the relative frequency of direct hits were category 4 hurricanes?" with "What was the relative frequency of direct hits THAT were category 4 hurricanes?"	Page 35, Exercise 1.12 23-24.
v1.17-3	Correction: Inserted question 1 which was absent in previous versions.	Page 66, Section 2.11.4
v1.17-4	Syntax Alteration: Clarified the directions by adding "in section 2.11.3" to the instructions.	Page 67, Section 2.11.8

Change Number	Description of the Change	Physical Location
v1.17-5	Correction: Relocated "Note" to appear before the choice options as opposed to between choices "f" and "g".	Page 120, Section 3.11.23
v1.17-6	Correction: Answer choice "D" has been changed from "$\frac{6}{32}$" to "$\frac{6}{36}$".	Page 122, Section 3.11.29.
v1.17-7	Syntax Alteration: The Directions were changed from "Match the number to the correct letter." to "Answer the following:".	Page 123, Section 3.12.
v1.17-8	Syntax Alteration: Omission of the phrase "known as".	Page 123, Section 3.12.1
v1.17-9	Correction: The third question of Practices 2,3,4, and 5 for Chapter 4 was concluded with a colon, but that has been replaced with a question mark.	Page 153, 4.11.3; Page 155, 4.12.3; Page 156, 4.13.3; Page 158, 4.14.3

Change Number	Description of the Change	Physical Location
v1.17-10	Syntax Alteration: Replaced the word "Problem" with "Exercise 4.15.12".	Page 165, Section 4.15.25
v1.17-11	Correction: Replace the word "data" with "date".	Page 211, Section 5.8.16
v1.17-12	Correction: Reformatted the list from being "bulleted" to a "named-item".	Page 303, Section 8.7.1
v1.17-13	Correction: Replace "24,52" with "24.52".	Page 328, Solution to Exercise 8.6.11
v1.17-14	Correction: Replaced "0.3" with "0.33".	Page 329, Solution to Exercise 8.7.8
v1.17-15	Correction: Replaced "0.80" with "0.08".	Page 329, Solution to Exercise 8.8.8
v1.17-16	Correction: Replaced "0.02" with "0.04".	Page 331, Solution to Exercise 8.9.11
v1.17-17	Correction: Replaced "94" with "84".	Page 332, Solution to Exercise 8.9.19

Change Number	Description of the Change	Physical Location
v1.17-18	Syntax Alteration: Replaced "Show the formula set-up and calculate σx." with Calculate σx. Make sure to show how you set up the formula."	Page 359, Section 9.15.7
v1.17-19	Correction: Question 10.9.41 was incorrectly enter in two locations. The first entry was replaced with the correct question for 10.9.40.	Page 412, Section 10.9.40
v1.17-20	Syntax Alteration: For consistency, the instruction were changed from “Questions 1-3” to “For the next three questions”.	Page 416, Section 10.10; Page 418, below Section 10.10.9
v1.17-21	Correction: The Solution for Exercise 10.10.7 was changed from “$N \quad \frac{2.25}{\sqrt{16}}$ ” to “ $N \quad 2, \frac{.25}{\sqrt{16}}$ ”.	Page 428, Solution to Exercise 10.10.7

Change Number	Description of the Change	Physical Location
v1.17-22	Correction: The answer choice for “f.” is incorrect and was changed from “143.14cm” to “143.13cm”.	Page 522, Solution to Exercise 12.13.13
v1.17-23	Correction: Incorrect spelling in the table was replaced with “working-class”.	Page 536, Section 13.8.2
v1.17-24	Correction: The answer choices have been reorganized and choice “D.” is now “Answer choices B and C are both true”.	Page 545, Section 14.1.3
v1.17-25	Correction: The list format has been changed from a bulleted list to a named-item list.	Page 548, Section 14.1.12
v1.17-26	Correction: The list format has been changed from a bulleted list to a named-item list.	Page 549, Section 14.1.19

Change Number	Description of the Change	Physical Location
v1.17-27	Correction: The answer choices have been reorganized and choice “D.” is now “Answer choices A and B are both true”.	Page 549, Section 14.1.19
v1.17-28	Syntax Alteration: For consistency, “Questions 23-24” has been replaced with “The next two questions”.	Page 550, below section 14.1.22
v1.17-29	Syntax Alteration: Answer choice “C” was changed from “Both above are correct.” to “Both of the above answers choices are correct.”	Page 551, Section 14.1.24
v1.17-30	Correction: The list format has been changed from a bulleted list to a named-item list.	Page 552, Section 14.1.29

Change Number	Description of the Change	Physical Location
v1.17-31	Syntax Alteration: For Consistency several instances of “Questions xx-xx” have been replaced with “The next xx questions”.	Page 556, below section 14.2.3; Page 556, below section 14.2.5; Page 557, below section 14.2.7; Page 558, below section 5.2.12; Page 559, below section 14.2.15; Page 560, after section 14.2.18; Page 562, below section 14.2.28
v1.17-32	Correction: Removed spaces in between numerals in the decimals.	Page 559, Section 14.2.18

Listing of Changes from Print Version 1.17 to 1.21